

In the Drawings:

Please replace the drawings on file with the enclosed replacement sheets for Figures 1-4, which are marked accordingly. Also please enter the enclosed Figure 5 marked as "New Sheet." The chart which had been referenced by "Figure 5" is now referenced as "Figure 6." No new matter has been added.

REMARKS

The Office action dated June 3, 2009 is acknowledged. Claims 1-23 are pending in the instant application. Claims 1-7 and 13-17 have been rejected and claims 8-12 and 18-23 have been withdrawn. By the present Office Action response, claims 1, 4 and 7 have been amended and claims 24-30 have been added. In particular, claim 1 has been amended by limiting the position of the flow forming elements to be “arranged in the plasma reactor” by deleting the passages “at a position selected from the group consisting of before” and “and after.” New claim 24 includes the technical features of claim 4 which depends from claim 3, which in turn defines the reaction tube. New claims 25 and 26 pertain to flow-forming elements forming a special rotating gas stream, support for which may be found in the specification. New claims 27-30 are based on claims 8-11 but do not recite a “microwave induced plasma.” The claims are supported by the specification, where the method is described to be carried out with the device of the present invention independently by way of plasma generation. Reconsideration is respectfully requested in light of the amendments and arguments made herein. No new matter has been added.

Objection to the Drawings

The Examiner has objected to the drawings since there are two instances of Figure 2, one on a separate sheet and the other together with Figures 3 and 4 on another sheet. The Examiner requests corrected drawing sheets. The Examiner also states that the recited catalyst is not shown in the Figures.

In compliance with the Examiner's request, corrected drawing sheets are enclosed herewith with the pages labeled "Replacement Sheet" accordingly. The instance of Figure 2 which was on a separate sheet has been canceled.

New Figure 5 is also included herewith and labeled "New Sheet." Figure 5 shows a catalytically acting gas as an example of a catalyst in the reactor. Figure 5 is based on Figure 1 and the present specification. It is noted that the chart which had been referenced as "Figure 5" is now labeled "Figure 6."

No new matter has been added. Withdrawal of this objection is thus requested.

Objection to the Abstract

The Examiner has objected to the Abstract since 2 abstracts are in the application. In addition, one of the Abstracts includes the stand-alone phrase "Figure 2." An amended Abstract is enclosed herewith for entry into the application. The version without the stand-alone phrase "Figure 2" may be deleted. Withdrawal of this objection is requested.

Objection to the Specification

The Examiner has objected to the specification for exclusion of proper section headings. The Examiner also states that reference to character 1 as the gas outlet 1 on page 16 is incorrect.

A replacement specification in marked-up and clean formats is enclosed with proper section headings. "Gas outlet 1" has been corrected to "gas inlet 1."

Withdrawal of this objection is requested.

Rejection of claims 4 and 7 under 35 U.S.C. 112, second paragraph

The Examiner has rejected claims 4 and 7 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. In particular, the Examiner states that in claim 4 the recitations “the inlet,” “the outlet,” “the wall” and “the reaction tube” lack antecedent basis. In claim 7, the Examiner states that the recitation “the reaction tube” lacks antecedent basis. The Examiner also states that the recitation “said catalyst ... on bottoms, in a basket, or as a monolith” is confusing.

Claim 4 has been amended by inserting the passage “the plasma reactor has an inlet and an outlet,” the term “plasma” in front of “reactor” (in both instances) and deleting references to the reaction tube. The terms “plasma reactor” and “reactor” are synonymous terms (as supported by the specification); however, clarification has been provided. The technical features of claim 4, referring to the reaction tube, have been added to the claims in new claim 24 which depends from claim 3.

Claim 7 has been amended to refer to claim 3, which provides antecedent basis for the reaction tube. Moreover, to clarify the claim, the term “bottom” has been deleted and the catalyst is recited as being in “a basket” or in the form of “granules, nets, catalytically acting gases or as a monolith.” Support can be found in the present specification.

Withdrawal of this rejection is requested.

Rejection of claims 1-7 and 13-17 under 35 U.S.C. 102(b)

Claims 1 and 2 have been rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,015,442 (Hirai). The Examiner states that Hirai’s invention is directed to a sterilizing/deodorizing apparatus and that Hirai discloses that the apparatus

comprises a plasma reactor (ozonizer means by electric discharge) with a through-flow of gases which has a plasma chamber 22 and an adjustable flow forming element 26 for forming the flow of gases which is arranged before the plasma reactor.

Claims 1-7 and 13-17 have been rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,154,682 (Hartz, et al.). The Examiner states that Hartz, et al. teach a method and apparatus for removing contaminants from a gas and that the apparatus comprises a plasma reactor with a through-flow of gases which has a plasma chamber and a throttle valve (an adjustable flow forming element) for forming the flow of gases which is arranged after the plasma reactor.

Claims 1, 2, 4-6 and 13-16 have been rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,007,785 (Liou). The Examiner states that Liou teaches an apparatus for efficient ozone generation and discloses that the apparatus comprises a plasma reactor 20 with a through-flow of gases which has a plasma chamber and a valve 27 (an adjustable flow forming element) for forming the flow of gases which is arranged after the plasma reactor.

The Applicants respectfully disagree with the Examiner's conclusion and submit that the present invention as defined in the present claims, as amended, is patentably distinct from the invention disclosed in the prior art references discussed above. In particular, the presently claimed invention refers to a device for carrying out gas reactions, comprising a plasma reactor with a through-flow of gases having a plasma chamber. Plasma reactor flow-forming elements are arranged inside. Due to these flow-forming elements, which are adjustable, a zone is formed in the gas stream within the

plasma chamber which is flow-reduced.

For sake of clarification, the Applicants submit a brief explanation regarding the differences between “plasma reactor” and “ozone generator.” It is well known in the plasma technology art that the term “plasma” refers to a partially ionized gas in which a certain proportion of electrons are free rather than being bound to an atom or molecule. The ability of the positive and negative charges to move somewhat independently makes the plasma electrically conductive so that it responds strongly to electromagnetic fields. Plasma therefore has properties quite unlike those of solids, liquids or gases and is considered to be a distinct state of matter. Plasma typically takes the form of neutral gas-like clouds, such as for example in the case of stars. Like gas, plasma does not have a definite shape or definite volume unless enclosed in a container as is known to one skilled in the art. Unlike gas, in the influence of a magnetic field, plasma may form structures such as filaments, beams and double layers as is also known to one skilled in the art. Thus, the term “plasma” is used to describe a region containing balanced charges of ions and electrons.

Ozone generation, on the other hand, is a process where oxygen molecules are atomized by an energy source to connect to further oxygen molecules to form ozone. In general, the formation of ozone is not due to a plasma or even ions but due oxygen atoms. Since ozone is not plasma but a molecule, and since ozone is formed by atoms and not by oxygen inside a plasma, an ozone generator cannot be the same as a plasma generator. In other words, an ozone generator is not a plasma generator since it generates ozone and

not plasma.

Moreover, an ozone generator and a plasma reactor would not be confused by one skilled in the art, even if the energy source to dissipate the oxygen molecules to get oxygen atoms is a plasma. If the energy source dissipating the oxygen molecules is a plasma, then a plasma reactor has to be arranged inside of an ozone generator. Therefore, even in this case, it would be clear to one skilled in the art that the ozone generator is not the plasma reactor itself.

Regarding Hirai, the reference teaches a sterilizing/deodorizing apparatus comprising a UV-lamp (30) to generate ozone. In one sentence therein, the reference teaches that “other means utilizing electric discharge may also be employed” instead of the UV-lamp (col. 3, lines 51-56). Following this passage, it is clear that in the case of Hirai the “means utilizing electric discharge” are identified with reference 30. In contrast to the present invention, Hirai does not teach or disclose a plasma chamber being part of element 30 or flow forming elements being arranged inside of element 30. Therefore, the presently claimed invention is not anticipated by Hirai.

Regarding Hartz, et al., the reference teaches an apparatus for the removal of contaminants from gases. As disclosed in column 1, lines 36-54, the method of removal is based on the ionization of molecules by radioactive particles (alpha or beta particles). Since these particles are ionizing the single atoms of the molecules or the molecules themselves and the ions (and electrons) are accelerated and separated from one another by electric field (col. 2, lines 20-34), so that there is no possibility that the components could

form a plasma, where negative charges and positive charges are not separated but form one “mixture”. Therefore, Hartz, et al. do not disclose a plasma generator at all. In turn, Hartz, et al. do not teach any plasma chamber or flow-forming elements being arranged in the plasma reaction. Thus, Hartz, et al. fail to anticipate the presently claimed invention.

Regarding Liou, the reference teaches an apparatus for efficient ozone generation. A plasma generator may be arranged inside of the apparatus. However, in contrast to the present invention, Liou does not teach that this plasma generator could have a plasma chamber or adjustable flow-forming elements that are arranged inside. As noted by the Examiner, valve 27 is arranged before the ozone generator and not in a plasma reactor. Therefore, Liou fails to anticipate the presently claimed invention.

In view of the above, since none of the cited prior art references teach or disclose adjustable flow-forming elements that are arranged inside a plasma reactor or the forming of a stable plasma in a flow reduced zone of a gas flow, none of the references anticipate the presently claimed invention. In conclusion, it is submitted that the prior art fail to teach each and every limitation of the present claims, and therefore fail to anticipate the present invention as set forth in the present claims. Withdrawal of this rejection is respectfully requested.

Conclusion

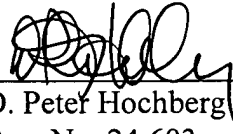
For the foregoing reasons, it is believed that the present application, as amended, is in condition for allowance, and such action is earnestly solicited. Based on the foregoing arguments, amendments to the claims and deficiencies of the prior art

references, the Applicants strongly urge that the anticipation rejections be withdrawn.

The Examiner is invited to call the undersigned if there are any remaining issues to be discussed which could expedite the prosecution of the present application.

Respectfully submitted,

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